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ABSTRACT

This collection consists of 41 collaborative lesson plans developed by 99 Virginia teachers at 18 primarily High Schools that Work (HSTW) and tech prep sites. It is divided into three sections: career connection, community connection, and consumer connection. Two types of lesson descriptions which support HSTW key practices, and Virginia's Tech Prep goals appear in each section. "Features" detail the real-world connection, materials needed, activities, and evaluation method. "Ideas" present a brief description of the activity. Career Connection lessons are as follows: An Account to Remember; Getting Down to Business; Safety First; Sound Check; The American Dream; Blood Typing; Flower Show; Growing, Growing, Grown; Here's Looking at You; Inch by Inch; Newsplash; Paper Planes; Raising the Roof; Shampoo Analysis; Tell Me a Story; and Wild News. Community Connection contains the following lessons: Exploring Culture through Weddings; How an Epidemic Spreads; La Fete de Mardi Gras; Mining and the Environment; America the Beautiful; Art and Religion in India; Un Buen Negocio; Genetics; Human Population Growth Rates; Is There Life Out There?; A New Industry; and Picture This. Consumer Connection consists of these lessons: Building a Foundation; Emergency! Chemical Spill; If I Had Terminal Cancer; Is Your Soap a Good Antiseptic?; Avoiding the Charge; Carbon Dioxide Production and Metabolism; Healthy Choices; House Beautiful; Learning from the Ancient Past; Making the Right Decision; Metric Conversions to Spanish; What Is a Serving?; and You and Your Blood Pressure. An index lists lesson plans by content subject area. (YLB)

ED 405 506

Collaborative Lesson Plans

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	Key Practices
Higher Expectations	1. Setting higher expectations and getting students to meet them.
Revising Vocational Curriculum	2. Increasing access to challenging vocational studies, with a major emphasis on using high-level mathematics, science, language arts, and problem-solving competencies in the context of modern business and technical studies.
Revising Academic Curriculum	3. Increasing access to academic studies that teach the essential concepts from the college preparatory curriculum through functional and applied strategies enabling students to see the relationship between course content and future roles they may envision for themselves.
Challenging Program of Study	4. Having students complete a challenging and related program of study, including four years of college preparatory English, three courses in mathematics and three in science, with at least two credits in each course equivalent in content to courses offered in the college preparatory program, and having students complete at least four courses in a technical major and two courses in related areas.
Teachers Working Together	5. Having an organizational structure and schedule that enable academic and vocational teachers to have the time to plan and deliver an integrated curriculum aimed at teaching high-status academic and technical content.
Changing the Instructional Process	6. Having each student actively engaged in the learning process.
Guidance and Advisement	7. Involving each student and his/her parent in an individualized advisement system aimed at ensuring that each student completes an accelerated and coherent program of academic study with a vocational or academic major.
Extra Help and Extra Time	8. Provide a structured system of extra help to enable students to successfully complete an accelerated program of study that includes high-level academic content and a major.
Assessment and Evaluation Information	9. Using student assessment and program evaluation information to check and improve curriculum, instruction, school climate, organization, and management.
Work-Based Learning	10. Providing students access to a structured system of work-based learning that is planned in collaboration with high-status school-based learning—high school and postsecondary—and that results in an industry-recognized credential and employment in a career pathway.

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Collaborative Lesson Plans

Developed by Virginia Teachers

Alleghany Highlands County Schools
Appomattox County Schools
Covington City Schools
Gloucester County Schools
Henrico County Schools
Jackson River Technical Center
Newport News City Schools
Norfolk City Schools
P. D. Pruden Technical Center
Salem City Schools
Suffolk City Schools
Wythe County Schools

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Virginia Community College System, Division of Student Services
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Tech Prep

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Preface

Encouraged by the publication of a small collection of ten lesson plans from Lakeland High School, teachers from a number of High Schools That Work/Tech Prep sites collaborated during the past year to develop lesson plans that supported the HSTW/key practices/ Virginia's Tech Prep goals and reinforced the Virginia Standards of Learning.

Selected for this year's collection are 41 lesson plans developed by 99 teachers at 18 different sites. These plans illustrate a small number of creative ways teachers can help students answer the age-old question, "Why do I have to learn this?"

A few of the lesson plans included here show how a single teacher can relate his or her own content area to other subjects. However, the majority involve a team of two or more teachers from different disciplines, illustrating the creativity and willingness to try something new that often results from the blending of diversified viewpoints.

The content of the lessons may relate to required academic subjects, academic electives, vocational electives, or a combination. Regardless of the subject areas, each lesson gives students the opportunity to put learning into practice in the context of the real world. Each lesson also challenges students to use a variety of thinking skills to solve meaningful problems.

I appreciate both the number and quality of this collection of lesson plans. I hope that these examples will encourage other teams of teachers to develop similar instructional plans that can be used as statewide models. I look forward to many more examples of instructional excellence.

Dr. Neils W. Brooks, Director
Office of Vocational and Adult Education Services
Virginia Department of Education

Acknowledgments

The following teachers collaborated with their colleagues to develop the lesson plans included in this collection:

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Introduction

This collection of collaborative lesson plans primarily from High Schools That Work (HSTW) and Tech Prep sites is designed to encourage teachers throughout Virginia to share their innovative ideas and creative teaching methods with others. The lessons selected for this publication reflect the key practices of HSTW and the goals of Virginia Tech Prep (see inside front and back covers for list).

Criteria for Selection

The lesson plans meet the following criteria:

- The activity supports key practices of HSTW/goals of Tech Prep.
- The content of the plan involves two or more subjects.
- The lesson reinforces the Virginia Standards of Learning.
- The plan has a real-world application or connection such as career development or community service.
- The plan includes an innovative activity or project or shows a creative way to teach basic skills.
- The lesson challenges and motivates students to solve problems through use of higher order thinking.
- The lesson plan can be adapted by other schools.
- The description is complete, clear, and accurate.

In some cases, similar lesson plans were submitted by more than one school system. Although only one was selected for publication, the names of the teachers responsible for sin.ilar plans are listed so that readers may contact them for information.

Content of the Collection

The lesson plans in this collection illustrate several methods of collaboration. A few are the work of a single teacher or a group of teachers in the same discipline, relating their subject matter to other disciplines. The majority represent a collaboration of two or more teachers in different subject areas. The content may link academic subjects (core or elective), vocational courses, or both. An index beginning on page 91 lists the lesson plans by subject area.

The collection is divided into three sections:

- **Career Connection:** activities that allow students to explore careers, set goals and objectives, prepare for employment, and develop plans for careers and independent living
- **Community Connection:** activities that encourage students to contribute to communities, explore other cultures, discover the relevance of history, and analyze current events
- **Consumer Connection:** activities that help students make responsible choices about resources at their disposal—time, money, health, energy, and environmental assets.

Two types of lesson descriptions appear in each section: *features* and *ideas*. Both have a title, a list of subjects covered by the content, one or more student objectives, related Standards of Learning, and a source of additional information. In addition,

- lesson *features* spell out the real-world connection, materials needed, the activities that make up the lesson, and the evaluation method
- lesson *ideas* present only a brief description of the activity and may include a suggestion from the VDOE specialist on how to strengthen the real-world connection or broaden student interest.

Regardless of the type of description included here, HSTW/Tech Prep lesson plans should focus on a culminating activity that connects the student to the real world and on the reinforcement of Virginia SOLs to further the student's understanding of vital academic knowledge.

Related Standards of Learning

Academic SOLs are an essential component of vocational education and are required to be successful in an occupational field. The identification of related academic SOLs that are reinforced through application in vocational or other elective courses supoorts and enhances academic instruction.

Although grade levels are not identified specifically for the lesson plans included here, every attempt has been made to identify related SOLs on approximately the same grade level. Also, the content of some lessons reinforce SOLs in addition to the subject areas identified for collaboration. (For example, a lesson that links art and biology may reinforce reading, writing, or research competencies outlined in the English SOLs.)

Submittal and Order Forms

The VDOE encourages teachers to send in lesson plans to the Virginia Vocational Curriculum and Resource Center for inclusion in the next annual edition of this document. To facilitate a consistent presentation, the VVCRC requests that a copy of the submittal form on page 95 be attached to each lesson. Teachers should write their names the way they would like them to appear in print.

An order form is included in this document (page 97). To be included on the mailing list for annual updates, please complete and return the form to the VVCRC.

Career Connection

- Learning skills for employment success, such as following directions, communicating effectively with others, solving problems, promoting the company image, and balancing work and family responsibilities
- Practicing technical skills required for work in a selected career field
- Exploring careers and identifying career aspirations
- Planning a pathway from school to career and independent living

An Account to Remember: Financing the Scientific, Artistic, and Literary Genius of Leonardo da Vinci

Lesson Feature

Subjects
Accounting, Art History, English, Physics

Objective
Produce an expense account for da Vinci, using present-day financial standards.

Real-World Connection
- Modern business demands that art and artifacts of the past be assigned a dollar value for purposes of insurance and comparison to other works.
- Research skills are in demand by today's employers.

Materials needed
- Art history slides
- References and research aids
- Chart of accounts, general ledger, and balance sheet

Activities

English
- Gather information on da Vinci's life and times, and analyze the contributions that made him a true "Renaissance Man."
- Review research and writing processes.

Physics
- Compile a list of da Vinci's inventions.
- Write a report on da Vinci's inventions and how they use the principles of physics.

Art History
- Examine and discuss slides detailing da Vinci's art.
- Write a report on da Vinci's art, analyzing it in terms of the principles and elements of design.

Art History, English, Physics
- Present da Vinci's life, art, and inventions to the Advanced Accounting students.
- Discuss the impact of da Vinci's art and inventions on today's artistic works, scientific concepts, and technological devices.

Accounting
- Assign value to da Vinci's art and inventions.
- Produce an expense account.

All students
- Host a Renaissance banquet and present Leonardo da Vinci's expense account.

Evaluation of student performance
- Art History, English, and Physics teachers evaluate research papers.
- Accounting teacher evaluates expense account.

Related Standards of Learning

English

12.1 The student will make a 5-10 minute formal oral presentation.
- Choose the purpose of the presentation: to defend a position, to entertain an audience, or to explain information.
- Use a well-structured narrative or logical argument.
- Use details, illustrations, statistics, comparisons, and analogies to support purposes.
- Use visual aids or technology to support presentation.

12.8 The student will write documented research papers.
- Evaluate the accuracy and usefulness of information.
- Synthesize information to support the thesis.
- Present information in a logical manner.
- Cite sources of information using a standard method of documentation.
- Edit for correct use of language, capitalization, punctuation, and spelling in final copies.
- Use available technology.

Physics

PH.4 The student will investigate and understand how applications of physics affect the world. Key concepts include
- principles with examples from the real world; and
- exploration of the roles and contributions of science and technology.

For more information, contact

Norfolk Public Schools

Granby High School, Norfolk (804) 441-1265:

Stephen Caja, Physics teacher
Althea Joyner, English teacher
Lisa Vitiello, Art History teacher
Judy Zondorak, Accounting teacher

Getting Down to Business

Subjects
English, U. S. History, Art, Agricultural Education, Business, Marketing, Architectural Drawing, Principles of Technology, Life Management, Special Education

Objective
Manufacture, sell, and distribute a product: a scale model of Alleghany High School appropriate for a windowsill display

Real-World Connection
Entrepreneurship projects offer practical experience in establishing and operating a business; manufacturing, packaging, promoting, selling, and distributing a product; and teaming to solve problems and attain goals.

Materials needed
- Historical references
- Computer with word processing, drawing, and spreadsheet applications
- Printer
- Fabric, sewing equipment, and sewing supplies
- Drawing paper, pencils
- Measuring instruments
- Product information
- Layout, brochure, promotional literature samples
- Brochure samples
- Silkscreening equipment and supplies
- Woodworking equipment and supplies
- Time sheets and ledgers
- Calculators
- Shipping supplies

Activities
- History and Social Science: Write a concise history of AHS to be printed on the back of a small replica of the building.
- Life Management: Construct a cloth bag to package the product.
- Architectural Drawing: Draw detailed views of the school to be used for screen printing.
- Marketing: Develop and distribute an order form for the product.
- Business: Prepare payroll; describe product for advertising materials; produce reports and correspondence; keep accounting records.
- Agriculture: Cut product from wood.
- Principles of Technology: Measure building and scale to size.
- Special Education: Prepare product for shipping and distribution.

Evaluation of student performance
Each teacher evaluates his or her students according to the group objective.

Related Standards of Learning

English

11.7 The student will write in a variety of forms with an emphasis on persuasion.

- Develop a focus for writing.
- Evaluate and cite applicable information.
- Organize ideas in a logical manner.
- Elaborate ideas clearly and accurately.
- Adapt content, vocabulary, voice, and tone to audience, purpose, and situation.
- Revise writing for accuracy and depth of information.
- Edit final copies for correct use of language, spelling, punctuation, and capitalization.

History and Social Science

11.17 The student will develop skills for historical analysis, including the ability to

- analyze documents, records, and data (such as artifacts, diaries, letters, photographs, journals, newspapers, historical accounts, etc.);
- evaluate the authenticity, authority, and credibility of sources;
- formulate historical questions and defend findings based on inquiry and interpretation;
- develop perspectives of time and place, including the construction of various time lines of events, periods, and personalities in American history; and
- communicate findings orally, in brief analytical essays, and in a comprehensive paper.

Mathematics

G.7 The student will solve practical problems involving right triangles by using the Pythagorean Theorem and its converse, properties of special right triangles, and right triangle trigonometry. Calculators will be used to solve problems and find decimal approximations for the solutions.

For more information, contact

Alleghany Highlands County Schools
Alleghany High School, Covington (540) 863-1700
Alleghany County, Alleghany Highlands County, Covington City, and Clifton Forge City Schools
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Sharon Leitch, Business teacher
Bob Martin, Agriculture teacher
Tim McClung, Business teacher
Gail Totten, Principles of Technology teacher
Bob Umstead, Special Education teacher

Note: This is a summary of a series of 13 lesson plans. Please contact the schools for a complete set.

Safety First

Subjects
Algebra I, English

Objective
Develop a safety newsletter for a local company.

Real-World Connection
A commitment to and knowledge of safety and the ability to convey statistical information in understandable terms are valuable ingredients of career success.

Materials needed
- Safety data from local manufacturer
- Samples of company's safety newsletters

Activities
- All students tour facility to gain an overview of the technical language, production terms, safety concerns, and areas of the plant.
- Using safety data provided by the plant safety director, algebra students organize and compute statistics and make graphs relating
  - injuries to the areas of the plant where injuries occurred
  - injured body parts to the areas of the plant where injuries occurred
  - injuries to causes
  - percentage of accidents based on shifts and times.
- English students use the statistics and graphs to compose, lay out, and print a safety newsletter for the company to distribute to employees in safety meetings.
- All students present oral and written summaries of their research.

Evaluation of student performance
- Algebra students are evaluated on the ability to meet deadlines, accuracy of statistical graphs, organization, behavior, participation, and written/oral presentation.
- English students are evaluated on the ability to meet deadlines; content, organization, and accuracy of newsletter; grammar and mechanics; behavior; and group/individual participation.

Related Standards of Learning
English

10.1 The student will participate in and report small-group learning activities.
- Assume responsibility for specific tasks.
- Participate in the preparation of an outline or summary of the group activity.
- Include all group members in oral presentation.

10.9 The student will use writing to interpret, analyze, and evaluate ideas.
- Explain concepts contained in literature and other disciplines.
- Translate concepts into simpler or more easily understood terms.

10.10 The student will collect, evaluate, and organize information.
- Organize information from a variety of sources.
- Verify the accuracy and usefulness of information.
- Use available technology.

Mathematics

A.1 The student will solve linear equations and inequalities in one variable, solve literal equations (formulas) for a given variable and apply these skills to solve practical problems. Graphing calculators will be used to confirm algebraic solutions.

A.4 The student will use matrices to organize and manipulate data, including matrix addition, subtraction, and scalar multiplication. Data will arise from business, industrial, and consumer situations.

For more information, contact

Covington City Schools

Covington High School, Covington (540) 962-3920:

Lisa Persinger, Algebra teacher

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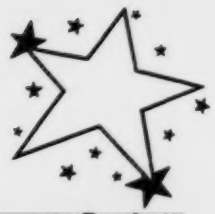
Sound Check



Lesson Feature

Subjects
Music (Concert and Marching Band), Physics

Objectives
- Determine the quality of sound or timbre.
- Differentiate between frequencies (harmonics).
- Investigate characteristic imperfections of certain ranges (or combinations of fingerings) on certain instruments.
- Describe intonation and timbre.

Real-World Connection
Musicians, sound technicians, and acoustical engineers must be able to examine the quality of sounds produced by different instruments and interpret the harmonic content of sound in terms of its quality.

Materials needed
- Rubber mallet
- Microphone
- Oscilloscope
- Tuning forks and tuner
- Woodwind or brass instruments

Activities
- Have students define vocabulary terms and practice pronunciation.
- Discuss sound production (reed and lip vibration, material vibration).
- Discuss results of too much mouthpiece in the mouth of woodwinds vs. not enough; pinched lips when playing brass instruments; and the stroke of a percussionist.
- Have students read a music selection and discuss the need to maintain a good tone quality.
- Mount a microphone to an oscilloscope.
- Have students play a note matching that of the tuning fork or tuner, monitor the oscillogram when the tuning fork is struck, and compare the oscillogram of the fork to that of a note that is emitted into the oscilloscope.
- Have students determine the fundamental, second, third, and fourth harmonics of the instrument through the comparison to a standard oscillogram.
- Discuss what happens when the quality of sound is not maintained and the reasons for these results.
- Have students construct a chart to demonstrate the differences in tone quality or timbre.

Evaluation of student performance
- Laboratory report must address all objectives.
- Calculations must be correct.
- 15-minute discussion of laboratory results must show knowledge of concepts studied.

Related Standards of Learning

Science

PH.9 The student will investigate and understand how to use models of transverse and longitudinal waves to interpret wave phenomena. Key concepts include

- wave characteristics (period, wavelength, frequency, amplitude and phase);
- fundamental wave processes (reflection, refraction, diffraction, interference, standing waves, polarization, Doppler effect); and
- light and sound in terms of wave models.

For further information, contact

Suffolk City Schools

Nansemond River High School, Suffolk (804) 925-5520:

Michael Carson, Music teacher

Gretchen Watson, Physics teacher

The American Dream: Past, Present, and Future

Subject
English

Objective
Transfer knowledge from one area to another by analyzing literature and relating written analyses to other disciplines.

> Students analyze "The American Dream" by Eric Sevareid and relate their analyses to other disciplines, including science, mathematics, history, technology, fine arts, and health. Relationships focus on a variety of freedoms such as freedom of expression (fine arts) and self-determination (health).

Suggestion: To enhance a real-world connection, students could write about their own individual and career aspirations and how they picture themselves as part of the "American dream" today and in the future.

Related Standards of Learning
English

9.3 The student will read and analyze a variety of literature.
- Identify the characteristics that distinguish literary forms.
- Use literary terms in describing and analyzing selections.
- Explain the relationships between and among elements of literature: characters, plot, setting, tone, point of view, and theme.
- Explain the relationship between author's style and literary effect.
- Describe the use of images and sounds to elicit the reader's emotions.
- Explain the influence of historical context on the form, style, and point of view of a written work.

9.6 The student will develop narrative, literary, expository, and technical writings to inform, explain, analyze, or entertain.
- Plan and organize writing.
- Communicate clearly the purpose of the writing.
- Write clear, varied sentences.
- Use specific vocabulary and information.
- Arrange paragraphs into a logical progression.
- Revise writing for clarity.
- Edit final copies for correct use of language, spelling, punctuation, and capitalization.

10.7 The student will develop a variety of writings with an emphasis on exposition.
- Plan and organize ideas for writing.
- Elaborate ideas clearly through word choice and vivid description.
- Write clear, varied sentences.
- Organize ideas into a logical sequence.
- Revise writing for clarity and content of presentation.

- Edit final copies for correct use of language, spelling, punctuation, and capitalization.
- Use available technology.

11.3 The student will read and analyze relationships among American literature, history, and culture.
- Describe contributions of different cultures to the development of American literature.
- Describe the development of American literature in the 17th, 18th, 19th, and 20th centuries.
- Contrast periods in American literature.
- Differentiate among archetypal characters in American literature.
- Describe the major themes in American literature.
- Describe how use of context and language structures conveys an author's point of view in contemporary and historical essays, speeches, and critical reviews.

For more information, contact

Norfolk City Schools

Granby High School, Norfolk (804) 441-1265:

Barbara Bowman, English teacher
Althea Joyner, English teacher
Rebecca Stein, English teacher
Scott Stubbe, English teacher
Deb Tarr, English teacher

Blood Typing

Subjects
Nursing, Biology, Applications in Biology and Chemistry

Objective
Type and cross match blood.

Students use kits to prepare slides, type simulated blood samples, detect the presence of Rh factor, and read the clotting reaction.

Related Standards of Learning
Science

BIO.1 The student will plan and conduct investigations in which
- observations of living things are recorded in the lab and in the field;
- hypotheses are formulated based on observations;
- variables are defined and investigations are designed to test hypotheses;
- graphing and arithmetic calculations are used as tools in data analysis;
- conclusions are formed based on recorded quantitative and qualitative data;
- impacts of sources of error inherent in experimental design are identified and discussed;
- validity of data is determined;
- alternative explanations and models are recognized and analyzed;
- appropriate technology is used for gathering and analyzing data and communicating results; and
- research is used based on popular and scientific literature.

BIO.7 The student will investigate and understand bases for modern classification systems. Key concepts include
- structural similarities in organisms;
- fossil record interpretation;
- comparison of developmental stages in different organisms;
- examination of protein similarities and differences among organisms;
- comparison of DNA sequences in organisms;
- systems of classification that are adaptable to new scientific discoveries; and
- examination of local flora and fauna where applicable.

For more information, contact
Wythe County Schools
George Wythe High School, (540) 228-3157:
Nancy Bean, Nursing instructor
L. R. Copenhaver, Biology teacher
Clayton Horne, Applications in Biology and Chemistry teacher

Flower Show

Subjects
English, Art, Horticulture

Objective
Create a brochure promoting a flower show.

> Students work in teams to gather information about the sale items, prices, dates, and times of a flower show and create a trifold brochure in three different formats to advertise the show and the horticultural items. They present the brochures to the class.

Suggestion: To strengthen a real-world connection, the English and art students could present their brochures to their clients (horticulture class) and let the clients select the ones to be printed and distributed.

Related Standards of Learning

English

11.1 The student will make persuasive presentations.
- Organize evidence to support a position.
- Present evidence clearly and convincingly.
- Support and defend ideas and thoughts in public forums.

11.2 The student will analyze and evaluate persuasive presentations.
- Critique the accuracy, relevance, and organization of evidence.
- Critique the clarity and effectiveness of delivery.

11.7 The student will write in a variety of forms with an emphasis on persuasion.
- Develop a focus for writing.
- Evaluate and cite applicable information.
- Organize ideas in a logical manner.
- Elaborate ideas clearly and accurately.
- Adapt content, vocabulary, voice, and tone to audience, purpose, and situation.
- Revise writing for accuracy and depth of information.
- Edit final copies for correct use of language, spelling, punctuation, and capitalization.

For more information, contact
Henrico County Schools
Hermitage High School, Richmond (804) 756-3000:
Frieda J. Mack, Art teacher
Linda Ostheimer, English teacher
Hermitage Technical Center, Richmond (804) 756-3020:
Caroline P. Frauenfelder, Horticulture teacher

Growing, Growing, Grown

Lesson Idea

Subjects
Agriculture, Chemistry, English

Objective
To improve the quality of products grown hydroponically

Students write technical instructions for mixing a hydroponic solution for growing lettuce. A second group follows the instructions to formulate the correct solution. Students then test the solution to determine the oxygen level and graph the results.

Suggestion: To strengthen the real-world connection, students could evaluate the lettuce produced under a variety of conditions according to industry standards, then adjust the hydroponic solution to improve the quality of the crop.

Related Standards of Learning

English

12.7 The student will develop expository and technical writings.
- Consider audience and purpose when planning for writing.
- Present ideas in a logical sequence.
- Elaborate ideas clearly and accurately.
- Revise writing for depth of information and technique of presentation.
- Edit final copies for correct use of language, spelling, punctuation, and capitalization.

Science

CH.3 The student will investigate and understand how conservation of energy and matter is expressed in chemical formulas and balanced equations. Key concepts include
- nomenclature;
- balancing chemical equations;
- writing chemical formulas—molecular, structural, empirical, and Lewis diagrams;
- bonding types—ionic, covalent;
- reaction types—synthesis, decomposition, single and double replacement, oxidation reduction, neutralization, nuclear, exothermic and endothermic, spontaneous/non-spontaneous, dissociation ionization;
- physical and chemical equilibrium; and
- reaction rates and kinetics: activation energy, catalysis, degree of randomness.

For more information, contact

Gloucester County Schools
Gloucester High School, (804) 693-2526:
Karen Flowe, English teacher
Sheila Austin-Dugas, Chemistry teacher
Harrison Dixon, Agriculture teacher

Here's Looking at You

Lesson Idea

Subjects
Psychology, Child Care

Objective
Observe and report to parents the developmental progress of selected children.

Psychology and Child Care students team up to observe an assigned child for a semester. They complete an observation form, discuss the theoretical and practical aspects of their observations, and write a report for the parent of the child. Selected students present their reports to the combined classes.

Related Standards of Learning

English

10.1 The student will participate in and report small-group learning activities.
- Assume responsibility for specific tasks.
- Participate in the preparation of an outline or summary of the group activity.
- Include all group members in oral presentation.

11.8 The student will write, revise, and edit personal and business correspondence to a standard acceptable in the work place and higher education.
- Apply a variety of planning strategies to generate and organize ideas.
- Organize information to support the purpose of the writing.
- Present information in a logical manner.
- Revise writing for clarity.
- Edit final copies for correct use of language, spelling, punctuation, and capitalization.
- Use available technology.

Science

BIO.1 The student will plan and conduct investigations in which
- observations of living things are recorded in the lab and in the field;
- hypotheses are formulated based on observations;
- variables are defined and investigations are designed to test hypotheses;
- graphing and arithmetic calculations are used as tools in data analysis;
- conclusions are formed based on recorded quantitative and qualitative data;
- impacts of sources of error inherent in experimental design are identified and discussed;
- validity of data is determined;
- alternative explanations and models are recognized and analyzed;
- appropriate technology is used for gathering and analyzing data and communicating results; and
- research is used based on popular and scientific literature.

BIO.5 The student will investigate and understand life functions of monerans, protists, fungi, plants, and animals, including humans. Key concepts include
- how their structures are alike and different;
- comparison of their metabolic activities;

- analyses of their responses to the environment;
- maintenance of homeostasis;
- human health issues, human anatomy, body systems, and life functions;
- how viruses compare with organisms; and
- observation of local organisms when applicable.

For more information, contact

Henrico County Schools

Highland Springs High School, Highland Springs (804) 328-4000:
Jeffrey Scoggin, Psychology teacher

Highland Springs Technical Center, Highland Springs (804) 328-4075:
Patricia Fleming, Child Care teacher

Varina High School, Richmond (804) 226-8700:
Barbara Henley, Child Care teacher

Inch by Inch

Lesson Idea

Subjects
Physical Education, Special Education

Objectives
- Measure distance.
- Draw conclusions from given data.

Students throw three different kinds of balls, measure the distances each ball travels in the air, and explain the differences in distance.

Suggestion: This lesson could serve as a good introduction as students proceed to measure other distances pertinent to daily living, such as the perimeter of a storage space or route to the bus stop. Students may be presented with other opportunities to draw conclusions from data or reason through problems under predictable and unpredictable circumstances.

Related Standards of Learning
Determined by student's Individual Education Plan

For more information, contact
Appomattox County Schools
Appomattox County High School, Appomattox (804) 352-7146:
Joe Fraley, Special Education teacher
Mary Tolley, Physical Education teacher

Newsplash

Subjects
Journalism, TV Production

Objective
Present school news in a timely and appealing manner.

Journalism students write broadcast scripts and act as anchors and remote reporters. TV Production students film the show and act as technical staff.

Related Standards of Learning

English

12.1 The student will make a 5-10 minute formal oral presentation.
- Choose the purpose of the presentation: to defend a position, to entertain an audience, or to explain information.
- Use a well-structured narrative or logical argument.
- Use details, illustrations, statistics, comparisons, and analogies to support purposes.
- Use visual aids or technology to support presentation.

12.2 The student will evaluate formal presentations.
- Critique relationships among purpose, audience, and content of presentations.
- Critique effectiveness of presentations.

12.7 The student will develop expository and technical writings.
- Consider audience and purpose when planning for writing.
- Present ideas in a logical sequence.
- Elaborate ideas clearly and accurately.
- Revise writing for depth of information and technique of presentation.
- Edit final copies for correct use of language, spelling, punctuation, and capitalization.

Mathematics

COM.8 The student will design and implement computer graphics, which will include topics appropriate for the available programming environment as well as student background. Students will use graphics as an end in itself, as an enhancement to other output, and as a vehicle for reinforcing programming techniques.

Science

PH.11 The student will investigate and understand how light behaves in the fundamental processes of reflection, refraction, and image formation in describing optical systems. Key concepts include
- application of the laws of reflection and refraction;
- construction and interpretation of ray diagrams;
- development and use of mirror and lens equations; and
- predictions of type, size, and position of real and virtual images.

For more information, contact
Suffolk City Schools
Lakeland High School, Suffolk (804) 925-5530:
Sue Ardelji, Journalism teacher
Isle of Wight County, Suffolk City Schools
P. D. Pruden Technical Center, Suffolk (804) 539-7407:
Warren Agey, TV Production teacher

Paper Planes

Subjects
Technology Education, Mathematics, Science, English

Objective
Construct paper planes, and measure and analyze their flights.

Students use a computer to construct paper planes, using a design of their choice. They measure the flights of all planes, then analyze the type of plane with the longest flight, drawing conclusions as to the factors that influenced the distance.

Related Standards of Learning

English

8.4 The student will comprehend what is read from a variety of sources.
- Draw on background knowledge and knowledge of text structure to understand selections.
- Analyze details for relevance and accuracy.
- Read and follow instructions to assemble a model or simple structure.
- Evaluate and synthesize information to apply in written and oral presentations.

Mathematics

8.10 The student will describe, classify, and construct plane figures and solid figures, including prisms, pyramids, cylinders, and cones.

8.19 The student will create and solve problems using proportions, formulas, and functions.

Science

PS.10 The student will investigate and understand scientific principles and technological applications of work, force, and motion. Key concepts include
- work, force, mechanical advantage, efficiency, power, horsepower, gravitational force, speed/velocity, mass/weight, Newton's three laws of motion, acceleration; and
- applications (simple machines, compound machines, powered vehicles, rockets, restraining devices, projectiles).

For more information, contact
Henrico County Schools
Mt. Vernon Middle School, Richmond (804) 527-4660:
Diane Morrison, Vocational teacher

Raising the Roof

Lesson Idea

Subjects
Geometry, Trigonometry, and Carpentry

Objective
Design and construct roof rafters that will withstand assigned stresses.

Math and carpentry students teach each other the appropriate concepts and skills to apply geometric and trigonometric functions to the construction of roof rafters.

Suggestion: Students could research local building codes to determine the pitch of rafters for buildings of various sizes within the community. Students could also gather information on how triangles are used to build other structures such as bridges and overpasses.

Related Standards of Learning

Mathematics

G.3 The student will solve practical problems involving complementary, supplementary, and congruent angles that include vertical angles, angles formed when parallel lines are cut by a transversal, and angles in polygons.

G.7 The student will solve practical problems involving right triangles by using the Pythagorean Theorem and its converse, properties of special right triangles, and right triangle trigonometry. Calculators will be used to solve problems and find decimal approximations for the solutions.

G.12 The student will make a model of a three-dimensional figure from a two-dimensional drawing and make a two-dimensional representation of a three-dimensional object. Models and representations will include scale drawings, perspective drawings, blueprints, or computer simulations.

T.1 The student will use the definitions of the six trigonometric functions to find the sine, cosine, tangent, cotangent, secant, and cosecant of an angle in standard position, given a point, other than the origin, on the terminal side of the angle. Circular function definitions will be connected with trigonometric function definitions.

T.9 The student will identify, create, and solve practical problems involving triangles and vectors. Techniques will include using the trigonometric functions, the Pythagorean Theorem, the Law of Sines, and the Law of Cosines.

For more information, contact

Suffolk City Schools
Nansemond River High School, Suffolk (804) 925-5520
Susan Braford, Geometry and Calculus teacher
Isle of Wight County, Suffolk City Schools
P. D. Pruden Technical Center, Suffolk (804) 539-7407:
John Thompson, Carpentry teacher

Shampoo Analysis

Subjects
Cosmetology, Applications in Biology and Chemistry

Objective
Recommend a shampoo based on quality and cost.

Using a shampoo analysis kit and samples of commercial shampoos, students prepare three samples of each shampoo and test one sample for pH, one sample for solids content, and one sample for flash foam formation. Based on the test results, students select shampoos of best quality and compare the cost per ounce.

Related Standards of Learning
Science

BIO.3 The student will investigate and understand biochemical principles essential for life. Key concepts include
- water chemistry and its impact on life processes;
- the structure and function of macromolecules;
- the nature of enzymes; and
- the significance of and relationship between photosynthesis and respiration.

CH.4 The student will investigate and understand that quantities in a chemical reaction are based on molar relationships. Key concepts include
- avogadro's principle, molar volume;
- stoichiometric relationships;
- partial pressure;
- gas laws;
- solution concentrations;
- chemical equilibrium; and
- acid/base theory: strong/weak electrolytes, dissociation/ionization (pH, pOH), and titration.

For more information, contact
Wythe County Schools
George Wythe High School, (540) 228-3157:
Angie Lawson, Cosmetology teacher
Clayton Horne, Applications in Biology and Chemistry teacher

Henrico County Schools
Hermitage High School, Richmond (804) 756-3000:
Jane Westbrook, Biology teacher
Hermitage Technical Center, Richmond (804) 756-3020:
Dawn Shumaker, Cosmetology teacher
Mary Colgin, Cosmetology teacher

Tell Me a Story

Lesson Feature

Subjects
English, Art, Communication Technology

Objective
Create a written work that appeals to a certain age or interest group.

Students analyze a variety of children's literature, then write, illustrate, and produce a book for elementary school children.

Suggestions

- Include students who are studying Child Care or early childhood development to ensure age appropriateness.
- Pilot test the book with different ages to determine appropriate content, language, and illustrations. Revise based on the market research before printing and binding.

Related Standards of Learning

English

10.8 The student will critique professional and peer writing.
- Analyze the writing of others.
- Describe how writing accomplishes its intended purpose.
- Suggest how writing might be improved.
- Apply knowledge of critical analysis to writing.

10.9 The student will use writing to interpret, analyze, and evaluate ideas.
- Explain concepts contained in literature and other disciplines.
- Translate concepts into simpler or more easily understood terms.

11.7 The student will write in a variety of forms with an emphasis on persuasion.
- Develop a focus for writing.
- Evaluate and cite applicable information.
- Organize ideas in a logical manner.
- Elaborate ideas clearly and accurately.
- Adapt content, vocabulary, voice, and tone to audience, purpose, and situation.
- Revise writing for accuracy and depth of information.
- Edit final copies for correct use of language, spelling, punctuation, and capitalization.

Mathematics

COM.8 The student will design and implement computer graphics, which will include topics appropriate for the available programming environment as well as student background. Students will use graphics as an end in itself, as an enhancement to other output, and as a vehicle for reinforcing programming techniques.

For more information, contact

Suffolk City Schools

Nansemond River High School, Suffolk (804) 925-5520:

Melvin Bradshaw, Communication Technology teacher
Jane Dailey, English teacher
Annette Lowe, Art teacher

Salem City Schools

Salem High School, Salem (540) 387-2437:

Helen Hinkle, English teacher
Judy Pitts, English teacher
Debbie Stratton, Work and Family Studies teacher
Jenny Wright, Special Education teacher

Wild News

Subjects
Child Care, Journalism

Objective
To inform parents and the community of events at a preschool child care center

Journalism students teach Child Care students the basics of newsletter writing. Pairs of students collaborate to develop and produce a newsletter for parents of children enrolled in a day care facility.

Related Standards of Learning

English

12.7 The student will develop expository and technical writings.
- Consider audience and purpose when planning for writing.
- Present ideas in a logical sequence.
- Elaborate ideas clearly and accurately.
- Revise writing for depth of information and technique of presentation.
- Edit final copies for correct use of language, spelling, punctuation, and capitalization.

Mathematics

COM.8 The student will design and implement computer graphics, which will include topics appropriate for the available programming environment as well as student background. Students will use graphics as an end in itself, as an enhancement to other output, and as a vehicle for reinforcing programming techniques.

For more information, contact
Henrico County Schools
Highland Springs High School, Highland Springs (804) 328-4000:
Cathy Saylowski, Journalism teacher
Highland Springs Technical Center, Highland Springs (804) 328-4075:
Patricia Fleming, Child Care teacher

Community Connection

- Contributing to the local, national, and international communities
- Exploring the geography and history of another country or society to develop an appreciation for its culture and traditions
- Learning to conduct business in the global marketplace
- Discovering the relevance and impact of historical events on today's society
- Keeping informed of current events

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Exploring Culture Through Weddings

Lesson Feature

Subjects
Marketing, World Geography

Objective
Explore cultures through identifying and analyzing factors that contribute to wedding rituals and attire.

Real-World Connection
Fashion and traditional ceremonies are indicators of culture. They can illustrate the religion, education, economics, politics, and class structure of a country or region of the world. Understanding, appreciating, and doing business with people in a foreign county is facilitated by a study of the customary dress and rituals of important events.

Materials needed
- Research references
- Booklet construction materials
- Computer

Activities
- Teacher ntroduces the concept of culture, especially cultural diversity within the United States, and discusses how weddings are a compilation of each culture's values and traditions.
- Students and teacher brainstorm and compile of list of the factors that influence culture.
- Student groups choose a country to research. They gather information about their selected country and describe how each of the cultural factors operates in that country.
- Students relate cultural factors to wedding traditions.

Evaluation of student performance
- Each group completes a Wedding Booklet.
- Each group conducts a wedding ceremony that illustrates cultural traditions.

Related Standards of Learning
History and Social Science

10.4 The student will analyze how certain cultural characteristics can link or divide regions, in terms of language, ethnic heritage, religion, political philosophy, social and economic systems, and shared history.

10.6 The student will analyze past and present trends in human migration and cultural interaction as they are influenced by social, economic, political, and environmental factors.

10.15 The student will apply geography to interpret the past, understand the present, and plan for the future by
- using a variety of maps, charts, and documents to explain historical migration of people, expansion and disintegration of empires, and the growth of economic systems;

and

- relating current events to the physical and human characteristics of places and regions.

For more information, contact

Newport News Public Schools

Menchville High School, Newport News (804) 886-7722:

Betty Dixon, Social Studies teacher

Gigi Lovett, Marketing teacher

How an Epidemic Spreads

Lesson Feature

Subjects
Nursing, Applications in Biology and Chemistry

Objective
Demonstrate how a disease can spread throughout a community.

Real-World Connection
An epidemic can wipe out a community very quickly. Knowing how the disease travels and following the instructions of epidemiologists and other health care professionals are the keys to protecting the community from a medical emergency.

Materials needed

- HCl acid of .0001N or less
- NaOH of .1N
- Phenolpthalein
- Test tubes

Activities

- Define *epidemic* and discuss the factors contributing to the progress of disease.
- Explain acid-base neutralization and how indicators can be used to detect pH changes.
- Partially fill a test tube for each student, using acid except for one. That test tube should be filled with base.
- Have students use a second test tube to reserve a small portion of their original solution for a control.
- Have students intermingle, giving fluid to three people and receiving fluid from three.
- Add a drop of phenolpthalein into each tube of fluid and look for pink color indicating infection.
- Have students trace the infection back to person zero.
- Add a drop of phenolpthalein into each control tube, look for pink color, and confirm person zero.

Evaluation of student performance
Based on effort and understanding of concepts by the individual student

Related Standards of Learning
Science

BIO.1 The student will plan and conduct investigations in which

- observations of living things are recorded in the lab and in the field;
- hypotheses are formulated based on observations;
- variables are defined and investigations are designed to test hypotheses;
- graphing and arithmetic calculations are used as tools in data analysis;
- conclusions are formed based on recorded quantitative and qualitative data;
- impacts of sources of error inherent in experimental design are identified and discussed;
- validity of data is determined;
- alternative explanations and models are recognized and analyzed;

- appropriate technology is used for gathering and analyzing data and communicating results; and
- research is used based on popular and scientific literature.

CH.1 The student will investigate and understand that experiments in which variables are measured, analyzed, and evaluated, produce observations and verifiable data. Key concepts include
- designated laboratory techniques;
- safe use of chemicals and equipment;
- proper response to emergency situations;
- multiple variables are manipulated with repeated trials;
- accurate recording, organizing, and analysis of data through repeated trials;
- mathematical and procedural error analysis; and
- mathematical manipulations (SI units, scientific notation, linear equations, graphing, ratio and proportion, significant digits, dimensional analysis, use of scientific calculator).

CH.6 The student will investigate and understand how basic chemical principles relate to other areas of chemistry. Key concepts include
- organic and biochemistry;
- nuclear chemistry; and
- environmental chemistry.

For more information, contact

Wythe County Schools

George Wythe High School, Wytheville (540) 228-3157:

Nancy Bean, Nursing instructor

Clayton Horne, Applications in Biology and Chemistry teacher

La Fete de Mardi Gras

Lesson Feature

Subjects
French IV, Business Computer Applications, Gourmet Foods

Objectives
Experience Mardi Gras through language, terminology, culture, geography, and social habits.

Real-World Connection
Traditional celebrations and food are indicators of culture. They can illustrate the religion, education, economics, politics, and class structure of a country or region. Understanding, appreciating, and doing business with people of a different culture is facilitated by a study of the customary foods and rituals of important events.

Materials needed
- Craft items for masks
- Computer and paper supplies
- Research materials
- French recipe books
- Cooking ingredients
- Props for the skit
- Decorating and table service supplies

French IV
Have students
- find a song
- create a skit
- provide French terms and research materials for other students
- make a mask.

Business Computer Applications
Have students
- search the internet for Mardi Gras materials and recipes
- prepare a newsletter, recipe book, program, banner, and entree place cards
- make a mask.

Gourmet Foods
Have students
- research customs of Mardi Gras and recipes for French and Cajun dishes
- prepare work schedules
- design banquet table and decorations
- prepare entrees and decorations
- make a mask.

Have all students
- distribute printed material with explanation
- present skit and teach song
- participate in the food festival
- integrate music with school band, art with mask judging, early childhood with observation of parade
- crown Mardi Gras King and Queen.

Evaluation of student performance
Acceptable performance requires presentation of skit and song, professional business preparation of printed materials, and professional food service preparation and presentation of entrees and decorations.

Related Standards of Learning

English

10.10 The student will collect, evaluate, and organize information.
- Organize information from a variety of sources.
- Verify the accuracy and usefulness of information.
- Use available technology.

History and Social Science

10.4 The student will analyze how certain cultural characteristics can link or divide regions, in terms of language, ethnic heritage, religion, political philosophy, social and economic systems, and shared history.

11.17 The student will develop skills for historical analysis, including the ability to
- analyze documents, records, and data (such as artifacts, diaries, letters, photographs, journals, newspapers, historical accounts, etc.);
- evaluate the authenticity, authority, and credibility of sources;
- formulate historical questions and defend findings based on inquiry and interpretation;
- develop perspectives of time and place, including the construction of various time lines of events, periods, and personalities in American history; and
- communicate findings orally, in brief analytical essays, and in a comprehensive paper.

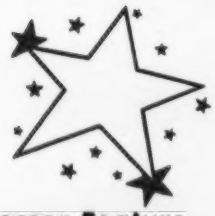
For more information, contact

Salem City Public Schools

Salem High School, Salem (540) 387-2437:

Laura Bolton, French teacher
Diana Dalton, Business Computer Applications teacher
Diane Wallace, Gourmet Foods teacher

Mining and the Environment



Subjects
Applications in Biology and Chemistry, Economics, Earth Science

Objectives
- Develop a plan for the use of natural resources.
- Illustrate how irresponsible mining may damage the environment.
- Measure profitability of mining as the resource depletes.
- Develop plans for reclamation of a mined area.

Real-World Connection
Managing the environment requires an understanding of the economics of natural resource mining and the environmental effects of mining activities due to competition and resource depletion.

Materials needed
- Shoe boxes
- Dried beans
- Paper cups
- Birdseed
- Spoons
- Paper and pencil
- Graph paper
- Stopwatch or watch with second hand

Activities
- Divide class into three groups, each representing a mining company.
- Provide each group with a shoe box 2/3 full of birdseed mixed with a large number of beans.
- Have each group mine beans (from their own box only) for 15 seconds (1 year); count and record the number of beans retrieved by each group.
- Repeat until all beans are mined. Do not return any beans to the box.
- Develop a graph comparing the three companies' mining yields to the years of mining.
- Record the amount of waste material (birdseed) removed in total and compared to competition.
- Note the scattering of waste material and suggest how mining regulations might prevent damages.
- Write a set of mining regulations that would protect the environment while ensuring profitability to the mining companies.

Extended activities
- Visit an active mining site.
- Interview a representative of the Environmental Protective Agency or the Federal Bureau of Mines.
- Write a law concerning land reclamation.

Evaluation of student performance
- Graphs of resources recovered for the years of mining
- Written proposals for land reclamation
- Profitability curves
- Debate on community zoning and governing of mining industries.

Related Standards of Learning

History and Social Science

12.15 The student will analyze the United States market economy, in terms of
- labor, capital, and natural resources;
- the interaction of supply and demand in markets;
- the role of private ownership, private enterprise, and profits;
- the relationships of households, firms, and government;
- labor/management relationships; and
- relationships to the global economy.

Science

ES.7 The student will investigate and understand the differences between renewable and nonrenewable resources. Key concepts include
- fossil fuels, minerals, rocks, water, and vegetation;
- advantages and disadvantages of various energy sources;
- resources found in Virginia;
- use of resources and their effects on standards of living; and
- environmental costs and benefits.

BIO.9 The student will investigate and understand dynamic equilibria within populations, communities, and ecosystems. Key concepts include
- interactions within and among populations including carrying capacities, limiting factors, and growth curves;
- nutrient cycling with energy flow through ecosystems;
- succession patterns in ecosystems;
- the effects of natural events and human influences on ecosystems; and
- analysis of local ecosystems.

CH.6 The student will investigate and understand how basic chemical principles relate to other areas of chemistry. Key concepts include
- organic and biochemistry;
- nuclear chemistry; and
- environmental chemistry.

For more information, contact

Wythe County Public Schools

George Wythe High School, Wytheville (540) 228-3157:

Clayton Horne, Applications in Biology and Chemistry teacher

America The Beautiful

Subjects
Business, Social Studies

Objective
Distribute geographical and historical information about states.

Students gather information about different states and compile it into a database showing a state map and facts such as state capital, flower, slogan, or products.

Suggestion: To strengthen real-world connection, students could use the research to produce postcards or greeting cards featuring a particular state. Products could be donated to elementary and middle schools as geography aids.

Related Standards of Learning

History and Social Science

11.15 The student will explain relationships between geography and the historical development of the United States by using maps, pictures, and computer databases to
- locate and explain the location and expansion of the original colonies;
- trace the advance of the frontier and the territorial expansion of the United States and explain how it was influenced by the physical environment;
- locate new states as they were added to the Union;
- understand the settlement patterns, migration routes, and cultural influence of various racial, ethnic, and religious groups;
- compare patterns of agricultural and industrial development in different regions as they relate to natural resources, markets, and trade; and
- analyze the political, social, and economic implications of demographic changes in the nation over time.

Mathematics

COM.16 The student will select and implement appropriate data structures, including arrays (one-dimensional and/or multidimensional), files, and records. Implementation will include creating the data structure, putting information into the structure, and retrieving information from the structure.

COM.17 The student will implement pre-existing algorithms, including sort routines, search routines, and animation routines.

For more information, contact

Suffolk City Public Schools
Lakeland High School, Suffolk (804) 925-5530:
Marsha Martin, Business teacher
James Shafer, U.S. History teacher

Art and Religion in India

Subjects
Art, History

Objectives

- Analyze the interplay of art and religion in Indian culture.
- Explain the contrasts and tensions among Buddhism, Islam, and Hinduism in India.
- Make an example of art work for each religion.

Small groups of students research, present, and debate Indian religions and the artwork that is representative of each religion. Art includes Buddhist clay statues, Hindu illustrated manuscripts, Islamic mosaics and architecture, and modern Indian art. Debate centers on the role that religions have in Indian social, political, and economic activities.

Related Standards of Learning

English

12.1 The student will make a 5-10 minute formal oral presentation.
- Choose the purpose of the presentation: to defend a position, to entertain an audience, or to explain information.
- Use a well-structured narrative or logical argument.
- Use details, illustrations, statistics, comparisons, and analogies to support purposes.
- Use visual aids or technology to support presentation.

History and Social Science

10.4 The student will analyze how certain cultural characteristics can link or divide regions, in terms of language, ethnic heritage, religion, political philosophy, social and economic systems, and shared history.

10.15 The student will apply geography to interpret the past, understand the present, and plan for the future by
- using a variety of maps, charts, and documents to explain historical migration of people, expansion and disintegration of empires, and the growth of economic systems; and
- relating current events to the physical and human characteristics of places and regions.

For more information, contact

Henrico County Public Schools
Hermitage High School, Richmond, (804) 756-3000:
Kevin Blusiewicz, Art teacher
Stephen Castle, History teacher

Un Buen Negocio

Subjects
Spanish, Catering

Objective
To demonstrate traditional Spanish customs

> Students prepare and serve a Spanish meal to illustrate the culture of foods and traditional Spanish customs.

Suggestion: Sharing food can be an important part of doing business with representatives of other countries. Students could strengthen the real-world connection by researching, preparing, and presenting a meal as a prelude or accompaniment to business conducted in a Spanish-speaking country.

Related Standards of Learning
History and Social Science

10.4 The student will analyze how certain cultural characteristics can link or divide regions, in terms of language, ethnic heritage, religion, political philosophy, social and economic systems, and shared history.

10.12 The student will analyze the patterns and networks of economic interdependence, with emphasis on formation of multi national economic unions, international trade, and the theory of competitive advantage, in terms of job specialization, competition for resources, and access to labor, technology, transportation, and communications.

For more information, contact
Suffolk City Public Schools
Lakeland High School, Suffolk (804) 925-5530:
Ana Morgan, Spanish teacher
Brenda Smith, Catering teacher

Genetics

Subjects
Biology, Applications in Biology and Chemistry

Objectives
- Explore the role of probability in determining the genetic makeup of offspring.
- Use genetic combinations to predict offspring features.

Students pair off and designate a "mom" and "dad." They toss a coin to determine genetic features, then draw a picture of the offspring as he or she would look at age 16.

Suggestion: Students could expand on their knowledge of genetics by researching current news of topics such as genetic conditions or diseases, genetic engineering, and DNA testing.

Related Standards of Learning
Science

BIO.6 The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include
- cell division;
- sex cell formation;
- cell specialization;
- prediction of inheritance of traits based on the laws of heredity;
- effects of genetic recombination and mutation;
- events involved in the construction of proteins; and
- exploration of the impact of DNA technologies.

For more information, contact
Wythe County Schools
George Wythe High School, Wytheville (540) 228-3157:
L. R. Copenhaver, Biology teacher
Clayton Horne, Applications in Biology and Chemistry teacher

Human Population Growth Rates

Subjects
Applications in Biology and Chemistry, Social Studies

Objectives
- Investigate human population growth in comparison with food and material production.
- Compare birth rates to the world's carrying capacity.
- Predict a population's growth based on past annual growth rate.

Students conduct three population growth trials by rolling cubes to determine births and deaths. The three trials vary by the amount of birth control practiced. Students graph the population curves for the three trials, summarize the effects of birth control on population expansion, and, using information on population shifts and global food production, write a proposal for zero population growth.

Related Standards of Learning

English

10.10 The student will collect, evaluate, and organize information.
- Organize information from a variety of sources.
- Verify the accuracy and usefulness of information.
- Use available technology.

11.7 The student will write in a variety of forms with an emphasis on persuasion.
- Develop a focus for writing.
- Evaluate and cite applicable information.
- Organize ideas in a logical manner.
- Elaborate ideas clearly and accurately.
- Adapt content, vocabulary, voice, and tone to audience, purpose, and situation.
- Revise writing for accuracy and depth of information.
- Edit final copies for correct use of language, spelling, punctuation, and capitalization.

History and Social Science

10.5 The student will compare and contrast the distribution, growth rates, and characteristics of human population, in terms of settlement patterns and the location of natural and capital resources.

10.10 The student will analyze the patterns of urban development, in terms of site and situation, the function of towns and cities, and problems related to human mobility, social structure, and the environment.

Science

BIO.1 The student will plan and conduct investigations in which
- observations of living things are recorded in the lab and in the field;
- hypotheses are formulated based on observations;
- variables are defined and investigations are designed to test hypotheses;

- graphing and arithmetic calculations are used as tools in data analysis;
- conclusions are formed based on recorded quantitative and qualitative data;
- impacts of sources of error inherent in experimental design are identified and discussed;
- validity of data is determined;
- alternative explanations and models are recognized and analyzed;
- appropriate technology is used for gathering and analyzing data and communicating results; and
- research is used based on popular and scientific literature.

BIO.9 The student will investigate and understand dynamic equilibria within populations, communities, and ecosystems. Key concepts include
- interactions within and among populations including carrying capacities, limiting factors, and growth curves;
- nutrient cycling with energy flow through ecosystems;
- succession patterns in ecosystems;
- the effects of natural events and human influences on ecosystems; and
- analysis of local ecosystems.

For more information, contact

Wythe County Schools

George Wythe High School, Wytheville (540) 228-3157:

Clayton Horne, Applications in Biology and Chemistry teacher

Is There Life Out There?

Subjects
Earth Science, English, Art

Objective
Describe life forms that will survive under a variety of conditions.

Small groups of students research the environmental conditions of selected planets and "create" life forms that could survive under those conditions. The top five life forms from each planet are described and illustrated in a book, along with similar information about Earth.

Related Standards of Learning

English

10.7 The student will develop a variety of writings with an emphasis on exposition.
- Plan and organize ideas for writing.
- Elaborate ideas clearly through word choice and vivid description.
- Write clear, varied sentences.
- Organize ideas into a logical sequence.
- Revise writing for clarity and content of presentation.
- Edit final copies for correct use of language, spelling, punctuation, and capitalization.
- Use available technology.

10.8 The student will critique professional and peer writing.
- Analyze the writing of others.
- Describe how writing accomplishes its intended purpose.
- Suggest how writing might be improved.
- Apply knowledge of critical analysis to writing.

10.9 The student will use writing to interpret, analyze, and evaluate ideas.
- Explain concepts contained in literature and other disciplines.
- Translate concepts into simpler or more easily understood terms.

10.10 The student will collect, evaluate, and organize information.
- Organize information from a variety of sources.
- Verify the accuracy and usefulness of information.
- Use available technology.

Science

ES.14 The student will investigate and understand the planets and other members of the solar system; the history and contributions of the space program; and concepts related to the origin and evolution of the solar system, galaxy, and universe. Key concepts include
- characteristics of the sun, planets, their moons, comets, meteors, and asteroids; and
- cosmology and the origin of stars and stellar systems (the Big Bang, the solar nebular theory, stellar evolution, star systems, nebulae, constellations, and galaxies).

For more information, contact

Appomattox County Public Schools

Appomattox County High School, Appomattox (804) 352-7146:

Susie Fischer, English teacher

Sylvia Hamlett, Earth Science teacher

WendyRichardson, Art teacher

A New Industry

Subjects
Applications in Biology and Chemistry, U. S. Government

Objectives
Compare the need for new industry to possible costs in quality of life.

Students have a "town meeting" to debate the benefits and costs of a selected new industry in the community. Each student or small group is assigned a profession or special interest and presents a pro or con argument consistent with their role. Concerns include environmental issues (conservation of natural resources, air and water quality) and ethical issues (weighing human economic gain against possible loss of wildlife and natural resources). Students conclude the lesson with a referendum.

Related Standards of Learning

History and Social Science

12.6 The student will analyze in writing, discussion, and debate current issues confronting local, state, and national governments in terms of perennial challenges to democracies, including conflicts between
- majority rule and minority rights;
- individual rights and the public interest;
- levels of taxation and the expectation of public services; and
- state and national authority in a federal system.

12.9 The student will identify and distinguish among the units of local governments in Virginia, including counties, cities, towns, and regional authorities and will analyze a local public issue.

12.10 The student will explain and give current examples of how political parties, interest groups, the media, and individuals influence the policy agenda and decision making of government institutions.

Science

BIO.3 The student will investigate and understand biochemical principles essential for life. Key concepts include
- water chemistry and its impact on life processes;
- the structure and function of macromolecules;
- the nature of enzymes; and
- the significance of and relationship between photosynthesis and respiration.

For further information, contact
Wythe County Schools
George Wythe High School, Wytheville (540) 228-3157:
Clayton Horne, Applications in Biology and Chemistry teacher

Picture This

Subjects
Art, History

Objective
Illustrate a particular point of view through satire or humor.

Students research and analyze political cartoons, learn to draw caricatures, and produce original cartoons covering a current issue.

Suggestion: To strengthen a real-world connection, students could choose a school or community activity (election or public service campaign) and submit cartoons to the school or community newspaper.

Related Standards of Learning

English

11.2 The student will analyze and evaluate persuasive presentations.
- Critique the accuracy, relevance, and organization of evidence.
- Critique the clarity and effectiveness of delivery.

11.7 The student will write in a variety of forms with an emphasis on persuasion.
- Develop a focus for writing.
- Evaluate and cite applicable information.
- Organize ideas in a logical manner.
- Elaborate ideas clearly and accurately.
- Adapt content, vocabulary, voice, and tone to audience, purpose, and situation.
- Revise writing for accuracy and depth of information.
- Edit final copies for correct use of language, spelling, punctuation, and capitalization.

History and Social Science

11.16 The student will interpret the significance of excerpts from famous speeches and documents in United States history, including "The Letter from Birmingham Jail," "Speak softly and carry a big stick...," "The Gettysburg Address," and "The Virginia Statute of Religious Freedom."

11.17 The student will develop skills for historical analysis, including the ability to
- analyze documents, records, and data (such as artifacts, diaries, letters, photographs, journals, newspapers, historical accounts, etc.);
- evaluate the authenticity, authority, and credibility of sources;
- formulate historical questions and defend findings based on inquiry and interpretation;
- develop perspectives of time and place, including the construction of various time lines of events, periods, and personalities in American history; and
- communicate findings orally, in brief analytical essays, and in a comprehensive paper.

11.18 The student will develop skills in discussion, debate, and persuasive writing with respect to enduring issues and determine how divergent viewpoints have been addressed and reconciled. Such issues include
- civil disobedience vs. the rule of law;
- slavery and its impact;
- the relationship of government to the individual in economic planning and social programs;
- freedom of the press vs. the right to a fair trial;
- the tension between majority and minority rights;
- problems of intolerance toward racial, ethic, and religious groups in American society; and
- the evolution of rights, freedoms, and protections through political and social movements.

12.6 The student will analyze in writing, discussion, and debate current issues confronting local, state, and national governments in terms of perennial challenges to democracies, including conflicts between
- majority rule and minority rights;
- individual rights and the public interest;
- levels of taxation and the expectation of public services; and
- state and national authority in a federal system.

12.10 The student will explain and give current examples of how political parties, interest groups, the media, and individuals influence the policy agenda and decision making of government institutions.

For more information, contact

Suffolk City Schools
Lakeland High School, Suffolk (804) 925-5530:
Richard Ewell, U. S. History teacher
Barbara West, Art teacher

Appomattox County Schools
Appomattox County High School, Appomattox, (804) 352-7146:
Wendy Richardson, Art teacher
Teresa Woods, Social Studies teacher

Norfolk City Schools
Granby High School, Norfolk (804) 441-1265:
Fred Harnett, U. S. Government teacher

Consumer Connection

- Becoming a careful consumer of products and services for the benefit of self and family
- Making decisions about personal wants and needs and setting goals for acquisition
- Gaining awareness of consumer rights, responsibilities, and protections
- Managing personal time and energy effectively
- Conserving natural resources and caring for the environment
- Investing for future gain

BEST COPY AVAILABLE

Building a Foundation

Lesson Feature

Subjects
Earth Science, Computer-Aided Drafting

Objective
Select the best foundation for a building based on soil type, stresses, and construction technique.

Real-World Connection
Consumers must have an overall understanding of construction principles in order to select the best contractor or builder. In addition, problems with shrink-swell soil in several residential areas of Chesterfield County have been documented recently in the news.

Materials needed
- CAD workstations
- Sample drawings, demo drawings
- Handouts on soil types and building stresses
- Soil samples

Activities
- In the Earth Science classroom, students gain an overview of local soil types by studying soil samples, pictures illustrating the local topography, and charts outlining the frost depths in the area.
- In the CAD lab, pairs of Earth Science and CAD students draw three foundation types based on information learned and print them out to scale.
- Students summarize the advantages of foundations in each soil type.

Evaluation of student performance
Foundations should reflect appropriate materials and designs for three different types of soil found in the local community.

Related Standards of Learning
Mathematics

G.7 The student will solve practical problems involving right triangles by using the Pythagorean Theorem and its converse, properties of special right triangles, and right triangle trigonometry. Calculators will be used to solve problems and find decimal approximations for the solutions.

G.12 The student will make a model of a three-dimensional figure from a two-dimensional drawing and make a two-dimensional representation of a three-dimensional object. Models and representations will include scale drawings, perspective drawings, blueprints, or computer simulations.

Science

ES.8 The student will investigate and understand geologic processes including plate tectonics. Key concepts include
- how geologic processes are evidenced in the physiographic provinces of Virginia including the Coastal Plain, Piedmont, Blue Ridge, Valley and Ridge, and Appalachian Plateau;

- processes (faulting, folding, volcanism, metamorphism, weathering, erosion, deposition, and sedimentation) and their resulting features; and
- tectonic processes (subduction, rifting and sea floor spreading, and continental collision).

For more information, contact

Henrico County Schools

Hermitage High School, Richmond (804) 756-3000:

Carolyn Hawthorne, Earth Science teacher

Hermitage Technical Center (804) 756-3020:

Johnnie Collie, CAD teacher

Emergency! Chemical Spill

Subjects
Earth Science, Applications in Biology and Chemistry

Objective
Assess the environmental damages of a chemical spill.

Real-World Connection
Disposal of toxic chemicals is a monumental problem that affects individual home maintenance as well as large manufacturing plants.

Materials needed

- pH paper or meter
- Gravel
- Ring stand w/ clamp, buret, and funnel
- 2-liter plastic bottle and fine mesh wire
- HCl and rainwater
- Beaker, graduated cylinder
- Ruler
- Graph paper

Activities

- Cut the plastic bottle in half, and invert the top portion with ring stand mount. Place wire screen in the neck of the bottle, and attach the buret above the bottle.
- Add a layer of gravel above the screen and cover with soil. Fill a beaker with 250 ml. of rainwater, and test for pH. Pour rainwater over the soil, allowing it to pass downward through the neck of the bottle and into a catch basin. Test pH again.
- Using buret, add 25 ml. of HCl (2.0N) at a rate of 3 to 5 drops per second. Allow acid to pass through the soil and mix in with the groundwater in the catch basin. Retest pH. Repeat six to seven times.
- Develop a graph using the pH data from acid spills.

Evaluation of student performance
Based on the graph, an understanding of pH scale, and laboratory methods and safety procedures

Related Standards of Learning
Science

ES.7 The student will investigate and understand the differences between renewable and nonrenewable resources. Key concepts include
- fossil fuels, minerals, rocks, water, and vegetation;
- advantages and disadvantages of various energy sources;
- resources found in Virginia;
- use of resources and their effects on standards of living; and
- environmental costs and benefits.

ES.9 The student will investigate and understand how freshwater resources are influenced by geologic processes and the activities of humans. Key concepts include
- processes of soil development;
- development of karst topography;
- identification of groundwater zones including water table, zone of saturation, and zone of aeration;

- identification of other sources of fresh water including aquifers with reference to the hydrologic cycle; and
- dependence on freshwater resources and the affects of human usage on water quality.

BIO.1 The student will plan and conduct investigations in which
- observations of living things are recorded in the lab and in the field;
- hypotheses are formulated based on observations;
- variables are defined and investigations are designed to test hypotheses;
- graphing and arithmetic calculations are used as tools in data analysis;
- conclusions are formed based on recorded quantitative and qualitative data;
- impacts of sources of error inherent in experimental design are identified and discussed;
- validity of data is determined;
- alternative explanations and models are recognized and analyzed;
- appropriate technology is used for gathering and analyzing data and communicating results; and
- research is used based on popular and scientific literature.

For more information, contact

Wythe County Schools

George Wythe High School, Wytheville (540) 228-3157:

Delores Craig, Earth Science teacher

Clayton Horne, Applications in Biology and Chemistry teacher

If I Had Terminal Cancer

Lesson Feature

Subjects
English, Applications in Biology and Chemistry

Objective
Establish priorities and set goals for a limited lifetime.

Real-World Connection
In addition to goal-setting and time management, this lesson helps students to understand a cancer patient's point of view, to learn about the different forms of cancer, and to develop an appreciation for the quality of life.

Materials needed
- Paper and pencil
- Computer with word processing package

Activities
- Investigate the four basic types of cancer.
- Discuss the things a person might consider to be most important in life.
- Imagine what it might be like to have a terminal illness and have only three to five years to live.
- Write a paper stating what you would consider to be the most and least important things in life if you were a victim of a terminal illness. Include how you would like to use your time.

Extended Activities
- Visit a hospital or cancer center.
- Have a cancer survivor speak to the class.
- Have a doctor or nurse speak to the class.

Evaluation of student performance
- A written paper
- Participation in oral discussion

Related Standards of Learning
English

10.8 The student will critique professional and peer writing.
- Analyze the writing of others.
- Describe how writing accomplishes its intended purpose.
- Suggest how writing might be improved.
- Apply knowledge of critical analysis to writing.

10.9 The student will use writing to interpret, analyze, and evaluate ideas.
- Explain concepts contained in literature and other disciplines.
- Translate concepts into simpler or more easily understood terms.

10.10 The student will collect, evaluate, and organize information.
- Organize information from a variety of sources.
- Verify the accuracy and usefulness of information.
- Use available technology.

Science

BIO.2 The student will investigate and understand the history of biological concepts. Key concepts include

- evidence supporting the cell theory;
- scientific explanations of the development of organisms through time;
- causative agents of disease;
- the evolution of the DNA model; and
- the collaborative efforts of scientists, past and present.

For more information, contact

Wythe County Schools

George Wythe High School, Wytheville (540) 228-3157:

Clayton Horne, Applications in Biology and Chemistry teacher

Is Your Soap a Good Antiseptic?

Lesson Feature

Subject
Applications in Biology and Chemistry

Objective
Determine the effectiveness of soaps as inhibitors of skin microorganisms.

> **Real-World Connection**
> Consumers can judge the germ-fighting quality of selected soaps offered for sale by comparing samples.

Materials needed

- Petri plates with agar
- Incubator
- Soap solutions
- Screw cap tubes w/ nutrient broth
- Marking pencil & masking tape
- Cotton swabs
- Ethanol
- Forceps
- Paper disks

Activities

- Collect a sample of microbes from under a fingernail with a cotton swab, and immerse it into the broth tube for incubation.
- Prepare petri plates with agar.
- Sterilize paper disks with ethanol and dry.
- After one day of incubation, use the broth tubes to make smears on the agar plates.
- Treat the sterile paper disks with various soap samples.
- Place the disks on areas of the smears. Leave on plate as a control. Label each soap type and incubate.
- Check for microbial growth for three to five days, and record data.

Evaluation of student performance
Evaluation is based on

- proper laboratory techniques and safety procedures
- daily preparation of a graph of microorganism growth results
- daily mathematical estimates comparing the sample's inhibiting qualities to the control
- written report of the qualities of the various soaps in the experiment.

Related Standards of Learning
Science

BIO.1 The student will plan and conduct investigations in which

- observations of living things are recorded in the lab and in the field;
- hypotheses are formulated based on observations;
- variables are defined and investigations are designed to test hypotheses;
- graphing and arithmetic calculations are used as tools in data analysis;
- conclusions are formed based on recorded quantitative and qualitative data;
- impacts of sources of error inherent in experimental design are identified and discussed;
- validity of data is determined;
- alternative explanations and models are recognized and analyzed;

- appropriate technology is used for gathering and analyzing data and communicating results; and
- research is used based on popular and scientific literature.

BIO.5 The student will investigate and understand life functions of monerans, protists, fungi, plants, and animals, including humans. Key concepts include
- how their structures are alike and different;
- comparison of their metabolic activities;
- analyses of their responses to the environment;
- maintenance of homeostasis;
- human health issues, human anatomy, body systems, and life functions;
- how viruses compare with organisms; and
- observation of local organisms when applicable.

Mathematics

A.5 The student will analyze a given set of data for the existence of a pattern, represent the pattern algebraically and graphically, if possible, and determine if the relation is a function.

For more information, contact

Wythe County Schools

George Wythe High School, Wytheville (540) 228-3157:

Clayton Horne, Applications in Biology and Chemistry teacher

Appomattox County Schools

Appomattox County High School, Appomattox (804) 352-7146:

Aelese Cobb, Health Assistant teacher
Maureen Crane, Food Occupations teacher
Michelle Whitehurst, Biology teacher

Avoiding the Charge

Lesson Idea

Subjects
Algebra I, Electricity

Objective
Follow safe practices when using electricity.

Students enrolled in both classes learn how to load and split a circuit, then find the voltage, power, and current readings on common household appliances. Small groups of students then use equations derived from Ohm's Law to calculate the voltage, power, or current as needed for each appliance. Class determines the total load for all items on the list.

Related Standards of Learning
Mathematics

A.2 The student will represent verbal quantitative situations algebraically and evaluate these expressions for given replacement values of the variables. Students will choose an appropriate computational technique, such as mental mathematics, calculator, or paper and pencil.

For more information, contact
Henrico County Schools

Hermitage High School, Richmond (804) 756-3000:

Cris Chilton, Mathematics teacher
Bonnie Clatterbough, Mathematics teacher
Becky Goshorn, Mathematics teacher
Brenda Gray, Mathematics teacher
John Krebbs, Mathematics teacher

Hermitage Technical Center, Richmond (804) 756-3020:

Pat Harmon, Electricity teacher

Carbon Dioxide Production and Metabolism

Subject
Applications in Biology and Chemistry

Objective
Develop a personal dietary plan to include appropriate carbohydrates.

Students compare their own production of carbon dioxide at rest and after exercise as an introduction to the following concepts:
- how the body uses carbohydrates
- the increase in energy usage during exercise
- the benefit of carbohydrates in a personal dietary plan.

Related Standards of Learning

Science

BIO.5 The student will investigate and understand life functions of monerans, protists, fungi, plants, and animals, including humans. Key concepts include
- how their structures are alike and different;
- comparison of their metabolic activities;
- analyses of their responses to the environment;
- maintenance of homeostasis;
- human health issues, human anatomy, body systems, and life functions;
- how viruses compare with organisms; and
- observation of local organisms when applicable.

For more information, contact

Wythe County Schools

George Wythe High School, Wytheville (540) 228-3157:

Clayton Horne, Applications in Biology and Chemistry teacher

Healthy Choices

Subjects
Biology, Catering, Mathematics, Business

Objective
Educate others about the importance of healthy eating and the dangers of high cholesterol and saturated fats in the diet.

> Students test the cholesterol levels of a random sampling of students at school and compare them to national statistics for the same age group. They plan and prepare a low-cholesterol, low-fat meal and survey the sample population as to the taste and quality of these foods. As a culminating activity, they prepare a brochure that contains their findings, explains how to read food labels, and discusses the benefits of a low-fat, low-cholesterol diet.

Related Standards of Learning
Mathematics

A.1 The student will solve linear equations and inequalities in one variable, solve literal equations (formulas) for a given variable and apply these skills to solve practical problems. Graphing calculators will be used to confirm algebraic solutions.

Science

BIO.5 The student will investigate and understand life functions of monerans, protists, fungi, plants, and animals, including humans. Key concepts include
- how their structures are alike and different;
- comparison of their metabolic activities;
- analyses of their responses to the environment;
- maintenance of homeostasis;
- human health issues, human anatomy, body systems, and life functions;
- how viruses compare with organisms; and
- observation of local organisms when applicable.

For more information, contact
Suffolk City Schools

Nansemond River High School, Suffolk (804) 925-5520:

Jacqueline Coppage, Business teacher
Deborah Creekmur, Work and Family Studies teacher
Darlene Lascano, Biology teacher
Nancy Jones, Mathematics teacher

House Beautiful

Subjects
Economics, Technical Drawing

Objective
Plan affordable housing that meets one's preferences.

Students design a house to suit their own preferences and calculate the cost of construction using recycled materials wherever possible. Students then calculate the purchase price and research mortgage qualification procedures to determine the requirements for getting a loan.

Suggestion: Students could design living space for a variety of consumer markets such as disabled or elderly individuals, large families, or advanced technology (smart house). As an alternative, students could research consumer credit, lending practices in the mortgage business, and laws designed to prevent discrimination in the housing industry.

Related Standards of Learning

History and Social Science

10.9 The student will identify natural, human, and capital resources, describe their distribution, and explain their significance, in terms of location of contemporary and selected historical economic and land-use regions.

10.10 The student will analyze the patterns of urban development, in terms of site and situation, the function of towns and cities, and problems related to human mobility, social structure, and the environment.

Mathematics

G.3 The student will solve practical problems involving complementary, supplementary, and congruent angles that include vertical angles, angles formed when parallel lines are cut by a transversal, and angles in polygons.

G.7 The student will solve practical problems involving right triangles by using the Pythagorean Theorem and its converse, properties of special right triangles, and right triangle trigonometry. Calculators will be used to solve problems and find decimal approximations for the solutions.

G.12 The student will make a model of a three-dimensional figure from a two-dimensional drawing and make a two-dimensional representation of a three-dimensional object. Models and representations will include scale drawings, perspective drawings, blueprints, or computer simulations.

For more information, contact
Suffolk City Schools
Nansemond River High School, Suffolk (804) 925-5520:
Hazel White, Economics teacher
Fred Wood, Engineering Drawing teacher

Learning from the Ancient Past

Subjects
Latin, Art

Objective
Relate classical art and architecture to today's society.

Students research and build scale models of Classical sculpture, artifacts, and architecture. They present their models to the class, along with information on the impact of the artifact on today's society. For example, students may feature inventions derived from the period or Classical styles for interior and exterior environments still used today.

Suggestion: Students could look for examples of Classical art and architecture in the local community and determine which principles and elements of design are present in modern buildings.

Related Standards of Learning

English

10.10 The student will collect, evaluate, and organize information.
- Organize information from a variety of sources.
- Verify the accuracy and usefulness of information.
- Use available technology.

12.1 The student will make a 5-10 minute formal oral presentation.
- Choose the purpose of the presentation: to defend a position, to entertain an audience, or to explain information.
- Use a well-structured narrative or logical argument.
- Use details, illustrations, statistics, comparisons, and analogies to support purposes.
- Use visual aids or technology to support presentation.

Mathematics

G.12 The student will make a model of a three-dimensional figure from a two-dimensional drawing and make a two-dimensional representation of a three-dimensional object. Models and representations will include scale drawings, perspective drawings, blueprints, or computer simulations.

For more information, contact
Appomattox County Schools
Appomattox County High School, Appomattox (804) 352-7146:
Melvin Herndon, Latin teacher
Wendy Richardson, Art teacher

Making the Right Decision

Subjects
English, Auto Body Repair, Auto Mechanics

Objective
Make and justify decisions concerning the purchase of a car.

In this series of hands-on lessons, students investigate the costs associated with car purchase and ownership and gain skills and knowledge about automobile operating systems and body damage and repair. They must select the best used car that they can afford and be able to justify their choice by citing facts and conclusions drawn from their investigation.

Suggestion: Students could produce a brochure for other students on what to look for in a used car.

Related Standards of Learning

English

11.2 The student will analyze and evaluate persuasive presentations.
- Critique the accuracy, relevance, and organization of evidence.
- Critique the clarity and effectiveness of delivery.

12.4 The student will read a variety of print material.
- Identify information needed to conduct a laboratory experiment or product evaluation.
- Draw conclusions regarding the quality of a product based on analysis of the accompanying warranty and instruction manual.
- Evaluate the quality of informational texts and technical manuals.
- Read and follow instructions to install a software program.

12.7 The student will develop expository and technical writings.
- Consider audience and purpose when planning for writing.
- Present ideas in a logical sequence.
- Elaborate ideas clearly and accurately.
- Revise writing for depth of information and technique of presentation.
- Edit final copies for correct use of language, spelling, punctuation, and capitalization.

For more information, contact
Henrico County Schools
Varina High School, Richmond (804) 226-8700:
Susan Knight, English teacher
Highland Springs Technical Center, Highland Springs (804) 328-4075:
Carlisle Rogers, Auto Mechanics teacher

Metric Conversions to Spanish

Subjects
Spanish, Applications in Biology and Chemistry

Objective
Establish a Spanish vocabulary for expressing metric quantities and conversions in various everyday situations.

Students practice converting English units of measurement to metric units, then write the measurement units in Spanish. They write statements in Spanish explaining how to make the conversions. To apply their translation skills they convert an ordinary grocery list and air travel advertisements into Spanish.

Suggestion: Students could write a handout on how to convert Spanish measurements to English for use in an ESL class.

Related Standards of Learning

Science

CH.1 The student will investigate and understand that experiments in which variables are measured, analyzed, and evaluated, produce observations and verifiable data. Key concepts include
- designated laboratory techniques;
- safe use of chemicals and equipment;
- proper response to emergency situations;
- multiple variables are manipulated with repeated trials;
- accurate recording, organizing, and analysis of data through repeated trials;
- mathematical and procedural error analysis; and
- mathematical manipulations (SI units, scientific notation, linear equations, graphing, ratio and proportion, significant digits, dimensional analysis, use of scientific calculator).

For more information, contact

Wythe County Schools
George Wythe High School, Wytheville (540) 228-3157:
Clayton Horne, Applications in Biology and Chemistry teacher
Betty Smith, Spanish teacher

Suffolk City Schools
Nansemond River High School (804) 538-5420:
Loveeta Britt, Mathematics teacher
Marla McClintock, French teacher

What Is a Serving?

Lesson Idea

Subjects
Applications in Biology and Chemistry, Work and Family Studies

Objective
Base individual food intake on the requirements for energy, vitamins, and minerals.

Students read food labels and discuss the RDA (recommended daily allowance) of calories, fat, cholesterol, vitamins, and minerals in a serving of selected foods. W&FS students prepare a meal based on a balanced diet menu and serve each student one serving of each food. Students then write a comparison of the meal served to that of a "normal" meal, addressing both their normal intake of food and hunger satisfaction.

Suggestion: Students could apply the information learned by designing a personal diet that incorporates nutritional requirements and satisfies hunger, based on the nutritional definition of *serving*.

Related Standards of Learning
Science

BIO.1 The student will plan and conduct investigations in which
- observations of living things are recorded in the lab and in the field;
- hypotheses are formulated based on observations;
- variables are defined and investigations are designed to test hypotheses;
- graphing and arithmetic calculations are used as tools in data analysis;
- conclusions are formed based on recorded quantitative and qualitative data;
- impacts of sources of error inherent in experimental design are identified and discussed;
- validity of data is determined;
- alternative explanations and models are recognized and analyzed;
- appropriate technology is used for gathering and analyzing data and communicating results; and
- research is used based on popular and scientific literature.

For more information, contact
Wythe County Schools

George Wythe High School, Wytheville (540) 228-3157:

Clayton Horne, Applications in Biology and Chemistry teacher

Sue Kidd, Work and Family Studies teacher

You & Your Blood Pressure

Subjects
English, Biology, Nursing, Printing

Objective
Produce and distribute an informational pamphlet on blood pressure.

Following an overview of the cardiovascular system, students learn to measure and record blood pressure. They investigate risk factors and variations in blood pressure from the normal range. As a culminating activity, students synthesize and publish the information in a pamphlet for other students and school staff.

Related Standards of Learning

English

11.4 The student will read a variety of print material.
- Use information from texts to clarify or refine understanding of academic concepts.
- Read and follow directions to complete an application for college admission, a scholarship, or for employment.
- Read and follow directions to complete a laboratory experiment.
- Extend general and specialized vocabularies for reading and writing.
- Generalize ideas from selections to make predictions about other texts.

12.7 The student will develop expository and technical writings.
- Consider audience and purpose when planning for writing.
- Present ideas in a logical sequence.
- Elaborate ideas clearly and accurately.
- Revise writing for depth of information and technique of presentation.
- Edit final copies for correct use of language, spelling, punctuation, and capitalization.

Science

BIO.5 The student will investigate and understand life functions of monerans, protists, fungi, plants, and animals, including humans. Key concepts include
- how their structures are alike and different;
- comparison of their metabolic activities;
- analyses of their responses to the environment;
- maintenance of homeostasis;
- human health issues, human anatomy, body systems, and life functions;
- how viruses compare with organisms; and
- observation of local organisms when applicable.

For more information, contact

Henrico County Schools

Hermitage High School, Richmond (804) 756-3000:

James Holley, Physical Science teacher
Linda Ostheimer, English teacher
Barbara Stewart, Assistant Principal

Hermitage Technical Center, Richmond (804) 756-3020:

Karen Gleason, Vocational teacher
Nancy Vacca, Nursing instructor

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Collaborative Lesson Plans
High Schools That Work/Tech Prep
Submittal Form

School Name, Telephone Number _____ School Division _____

Teacher Name, Subject Area (Please list your name the way you want it published.)

_____ _____

_____ _____

_____ _____

Lesson Description

Title _____

❑ Lesson Feature
- Objective(s)
- Real-world connection
- Materials needed
- Activities
- Evaluation (student)
- Related SOLs (#s only are sufficient)
- For more information...

❑ Lesson Idea
- Objective(brief statement of real-world connection)
- Concise description of main idea
- Related SOLs (#s only are sufficient)
- For more information...

Standards for selection

To be selected for publications, lesson plans must
- support key practices of HSTW
- involve two or more subjects in the content
- have a real-world application or connection such as career development or community service
- include an innovative activity or project that culminates in real products or services
- challenge and motivate students to solve problems through the use of higher order thinking
- be adaptable by other schools
- reinforce the Virginia Standards of Learning.

I understand that lesson plans accepted for publication become the property of the Virginia Department of Education and may be edited or enhanced to support the key practices of HSTW, goals of Virginia Tech Prep, and the Virginia Standards of Learning.

_____
Signature

Please submit lesson plans by April 30, 1997 to
Anita T. Cruikshank, Writer/Editor
VVCRC
2200 Mountain Road
Glen Allen, VA 23060-2208
Phone (804) 261-5075
FAX (804) 261-5079
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For more information on collaborative lesson plans or on High Schools That Work, contact
Lolita B. Hall, Specialist for Program Improvement
Office of Vocational and Adult Education
Virginia Department of Education
P.O. Box 2120
Richmond, VA 23218-2120
Phone (804) 225-3370 FAX (804) 371-2456
lbhall@pen.k12.va.us

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Goals of Tech Prep in Virginia

The following goals were developed by the Tech Prep Executive Committee and adopted by the State Tech Prep Advisory Board in 1993.

1. Improve academic and technical competence of students through unified curriculum, which includes world-of-work applications.

2. Facilitate a seamless transition for students from secondary to postsecondary education and the world of work.

3. Increase the number of students who earn high school diplomas and postsecondary certificates and degrees.

4. Prepare students for work by developing and implementing programs that are responsive to labor market needs.

5. Provide students with comprehensive career counseling and advising services.

6. Provide equal access for special populations (as defined by the Carl D. Perkins Vocational and Applied Technology Education Act of 1990) and minorities to Tech Prep equivalent to those accessible by the general population.

7. Inform students, parents, and the community about Tech Prep opportunities.

8. Contribute to economic development by providing a competitive workforce.

9. Initiate, stimulate, and support educational improvement at the secondary and postsecondary levels.

10. Create a community-based approach to Tech Prep by establishing partnerships among secondary and postsecondary edcuation.

11. Enhance academic and technical competence of educators through extensive professional development activities.

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